

What is claimed is:

1. An oscillation-type compressor comprising:
  - 5 a tightly closed casing having an inside space for storing coolant gas;
  - a block accommodated in said tightly closed casing;
  - a motor including a stator and a mover;
  - a piston connected to said mover of said motor;
  - 10 a movable element including said mover of said motor and said piston;
  - a stationary element including said stator of said motor and said block;
  - 15 an elastic element having a portion fixed to said movable element and another portion fixed to said stationary element;
  - a cylinder shiftable in an axial direction with respect said block; and
  - a shifting device for shifting said cylinder in said axial direction.
2. An oscillation-type compressor comprising:
  - 15 a tightly closed casing having an inside space for storing coolant gas;
  - a block accommodated in said tightly closed casing;
  - a motor including a stator and a mover;
  - a piston connected to said mover of said motor;
  - 20 a movable element including said mover of said motor and said piston;
  - a stationary element including said stator of said motor and said block;
  - 25 an elastic element having one portion fixed to said movable element and another portion fixed to said stationary element;
  - a cylinder shiftable with respect said block;
  - 25 a cylinder head fixed to said cylinder;
  - back-pressure chambers formed in said coolant gas space and airtightly partitioned by an integral unit including at least one of said cylinder and said cylinder head; and
  - 30 at least one of said back-pressure chambers being held at a low pressure level and another one of said back-pressure chambers being held at a high pressure level.

3. The oscillation-type compressor in accordance with claim 2, further comprising an elastic member having one end connected to said integral unit including at least one of said cylinder and said cylinder head and the other end connected to said stationary element.

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4. The oscillation-type compressor in accordance with claim 1, further comprising a cylinder position detecting sensor fixed to one of said stationary element and said cylinder.

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5. An oscillation-type compressor, comprising  
a tightly closed casing having an inside space for storing coolant gas;  
a block accommodated in said tightly closed casing;  
a motor including a stator and a mover;  
a piston connected to said mover of said motor;

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a movable element including said mover of said motor and said piston;  
a stationary element including said stator of said motor and said block;  
an elastic element having one portion fixed to said movable element and  
another portion fixed to said stationary element;

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a cylinder fixed to said block or shiftable in an axial direction with  
respect said block;

a cylinder head fixed to said cylinder;

an auxiliary pipe having one end shiftable in said axial direction with  
respect to one of an exhaust pipe and an intake pipe and the other end fixed to  
one of said cylinder and said cylinder head.

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6. An oscillation-type compressor comprising:

a block and a piston accommodated in a tightly closed casing;

a motor including a stator and a mover;

a movable element including said mover and said piston;

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a stationary element including said block and said stator;

an elastic element having a portion fixed to said movable element and

another portion fixed to said stationary element;

5 a cylinder accommodating said piston so that said piston is shiftable in an axial direction, said cylinder being inserted in said block so as to reciprocate in the axial direction with a closed space formed between said block and said cylinder;

10 a cylinder head comprising an exhaust chamber and attached to said cylinder; and

15 a communication passage connecting said closed space and said exhaust chamber.

20 7. The oscillation-type compressor in accordance with claim 6, wherein said closed space is connected to an outside space via an exhaust pipe.

25 8. The oscillation-type compressor in accordance with claim 6, wherein a slide surface between said cylinder and said block is connected to a lower part of said closed space via a passage.

30 9. The oscillation-type compressor in accordance with claim 6, wherein a groove is provided on a slide surface of one of said cylinder and said block.

10. An oscillation-type compressor comprising:

a tightly closed casing having an inside space for storing coolant gas;

a cylinder accommodated in said tightly closed casing;

a motor including a stator and a mover;

a piston connected to said mover of said motor;

a movable element including said mover of said motor and said piston;

a stationary element including said stator of said motor and said cylinder;

35 an elastic element having a portion fixed to said movable element and another portion fixed to said stationary element;

40 a piston position detecting sensor detecting the position of said piston;

top dead center position calculating means for calculating a top dead center position of said piston based on a piston position signal obtained from said piston position detecting sensor;

amplitude control means for controlling an amplitude of said mover in accordance with a difference between said top dead center position and a selected top dead center reference value; and

top dead center reference value changing means for changing said top dead center reference value.

## 11. An oscillation-type compressor comprising:

a tightly closed casing having an inside space for storing coolant gas;  
a cylinder and a block accommodated in said tightly closed casing;  
a motor including a stator and a mover;

15 a movable element including said mover of said motor and said piston;  
a stationary element including said stator of said motor, said cylinder  
and said block:

an elastic element having a portion fixed to said movable element and another portion fixed to said stationary element;

20 said stator of said motor or a movable stator base connected to said stator being partly coupled with said stationary element so as to reciprocate in an axial direction in response to a pressure imbalance between back-pressure chambers formed therebetween; and

25 a pressure control mechanism for controlling the pressures of said back-  
pressure chambers.

12. The oscillation-type compressor in accordance with claim 11, wherein shifting means is provided for shifting said stator of said motor in a direction opposed to said compression chamber when the compressor is stopped.

13. An oscillation-type compressor comprising:  
a block and a piston;  
a motor including a stator and a mover;  
a movable element including said mover and said piston;  
5 a stationary element including said block and said stator;  
an elastic element having a portion fixed to said movable element and  
another portion fixed to said stationary element;  
a cylinder accommodating said piston so as to allow said piston  
reciprocating in an axial direction;

10 a displacement detector connected to said piston in the axial direction  
for detecting a position near a top dead center of said piston;  
top dead center position detecting means for obtaining said top dead  
center position of said piston based on a signal obtained from said  
displacement detector;

15 current/voltage detecting means for detecting a current or voltage value  
of said motor; and  
power supply means for changing the voltage applied to said motor  
based on output signals of said top dead center position detecting means and  
said current/voltage detecting means.

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14. An oscillation-type compressor comprising:  
a block and a piston;  
a motor including a stator and a mover;  
a movable element including said mover and said piston;  
25 a stationary element including said block and said stator;  
an elastic element having a portion fixed to said movable element and  
another portion fixed to said stationary element;  
a cylinder accommodating said piston so as to allow said piston  
reciprocating in an axial direction; and

30 a displacement detector attached to said movable element and said  
stationary element at a radially inward portion with respect to said stator of

said motor.

15. An oscillation-type compressor comprising:
  - a block and a piston;
  - 5 a motor including a stator and a mover;
  - a movable element including said mover and said piston;
  - a stationary element including said block and said stator;
  - 10 an elastic element having a portion fixed to said movable element and another portion fixed to said stationary element;
  - 15 a rotational direction restricting mechanism for limiting the rotation of said elastic element about a piston shaft in a single direction;
  - a cylinder accommodating said piston so as to allow said piston reciprocating in an axial direction; and
  - 20 a dynamic pressure generating mechanism provided on at least one of said piston and said cylinder.
  
16. An oscillation-type compressor comprising:
  - a tightly closed casing;
  - 20 a piston and a cylinder accommodated in said tightly closed casing;
  - a motor including a stator and a mover;
  - a stationary element including said cylinder and said stator of said motor;
  - 25 a movable element including said piston and said mover of said motor;
  - an elastic element having a portion fixed to said movable element and another portion fixed to said stationary element; and
  - 30 a support mechanism for supporting said movable element in a radial direction when said piston is positioned near a top dead center position or a bottom dead center.
  
17. An oscillation-type compressor comprising:
  - a tightly closed casing;

a piston and a cylinder accommodated in said tightly closed casing;  
a motor including a stator and a mover;  
a stationary element including said cylinder and said stator of said  
motor;  
5 a movable element including said piston and said mover of said motor;  
an elastic element having a portion fixed to said movable element and  
another portion fixed to said stationary element; and  
a position changing mechanism associated with said movable element  
for changing an axial position of said movable element.

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18. The oscillation-type compressor in accordance with claim 17, further  
comprising a stopper for limiting an axial shift amount of said movable  
element changed by said position changing mechanism.

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